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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/517,683	12/10/2004	Ferdi Schuth	100716-58 (KGB)	3083
27384 7590 02/06/2007 NORRIS, MCLAUGHLIN & MARCUS, PA 875 THIRD AVENUE 18TH FLOOR NEW YORK, NY 10022			EXAMINER HAILEY, PATRICIA L	
			ART UNIT	PAPER NUMBER
			1755	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/06/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

**Application No.**

10/517,683

**Applicant(s)**

SCHUTH ET AL.

**Examiner**

Patricia L. Hailey

**Art Unit**

1755

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15 and 17 is/are rejected.
- 7) ☒ Claim(s) 14 and 16 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>05/04/05; 12/10/04</u> . | 6) <input type="checkbox"/> Other: _____  |

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***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Applicants' Priority Document or Documents was or were filed on December 10, 2004.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. ***Claims 1-12, 15, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Shigapov et al. (U. S. Patent No. 6,139,814).***

Shigapov et al. teach a method for producing a metal oxide product by steps including absorbing a liquid solution of metal oxide precursors onto crystalline or microcrystalline, porous structured organic material capable of being combusted at elevated temperatures; heating the organic material containing the absorbed solution for a time and at a temperature sufficient to vaporize the liquid, convert the metal oxide precursors to metal oxides, and combust the organic material. See the Abstract of Shigapov et al., as well as col. 3, lines 5-15 (considered to read upon **claims 1, 3, 7, 8, 10, and 17**).

Col. 2, lines 54-57 of Shigapov et al. state:

“The mold (i.e., pores of the organic template) is contacted with a liquid solution of metal salts or organometallic compounds that optimally essentially fill the pores, acting as the cast material.”

Thus, the maximum particle size of the resultant metal oxides produced from the precursors will be limited to the size of the pores in the organic template; this disclosure is considered to read upon **claim 2**.

The metal oxide products produced by the aforementioned process, wherein the metal oxide precursors comprise metals such as cerium, zirconium, praseodymium, or their mixtures, retain a BET surface area in excess of 55 m<sup>2</sup>/g after air calcination for 2 hours at 800°C and in excess of 15 m<sup>2</sup>/g after air calcination for 12 hours at 1050°C. See col. 3, lines 18-24 of Shigapov et al. (considered to read upon **claims 11 and 15**).

Exemplary metal oxide precursors also include any metal, such as cerium, zirconium, praseodymium, as well as virtually all the elements of the alkaline earth, transition metal, and lanthanide metal series of the Periodic Table. See col. 3, lines 25-56 of Shigapov et al., which also discloses that it is “particularly desired to manufacture oxides of metals like cerium and zirconium according to the present invention if the resultant metal oxides are to be used as catalyst supports” (lines 48-51; considered to read upon **claim 9**).

Exemplary organic template materials include activated carbons. See col. 4, line 51 to col. 5, line 30 of Shigapov et al. (considered to read upon **claim 4**).

Returning to the method, an organic template containing an absorbed solution of metal precursors, is heated to remove excess liquid, combust the organic template, and

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convert the metal salts to their respective oxides; this is generally, but not necessarily, carried out in two distinct steps—a drying step and a combustion step. Drying can be carried out at any temperature, preferably below the boiling point of the solvent. See col. 5, lines 32-46 of Shigapov et al.

The combustion step is carried out in air at a temperature that is sufficient to combust the organic template material while converting the metal salts to their respective oxides. See col. 5, line 47 to col. 6, line 5 of Shigapov et al. (considered to read upon **claims 5 and 6**).

After combustion, the synthesis of the oxide materials is essentially complete; however, the materials thus obtained may be ground to form fine powders (1-10  $\mu\text{m}$  in diameter), or may be impregnated with other metals (considered to read upon the limitation “supported catalyst” in **claim 12**). See col. 6, lines 6-24 of Shigapov et al.

In view of these teachings, Shigapov et al. anticipate claims 1-12, 15, and 17.

**4. Claims 1-10, 13, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Helble et al. (U. S. Patent No. 5,358,695).**

Helble et al. teach ceramic powders having nanometer scale grain structure and narrow grain size distribution. The powders, defined as non-agglomerated crystalline ceramic oxide particles in the range of 10 to 100 nm (see col. 3, lines 52 and 53 of Helble et al.), are produced by a process utilizing high temperature exothermic oxidation of an organic or carbonaceous carrier that has been combined with a ceramic precursor to form an intimate mixture. The mixture is atomized and exposed to a temperature

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sufficient to cause exothermic oxidation of the carrier material. See col. 3, line 52 to col. 4, line 15 of Helble et al. (considered to read upon **claims 1, 2, 5, 7, 8, 10, and 13**).

Examples of the carrier material include any combustible organic or carbonaceous materials, such as carbon. The ceramic precursor can be "any material which forms a ceramic under oxidizing conditions", such as metals, metal oxides, metal salts, and other metal compounds, as well as mixtures of these (which is considered to read upon the limitation "an oxide component and a metal component" in **claim 13**). See col. 4, lines 16-35 of Helble et al. (considered to read upon **claim 4**).

The mixture of carrier and precursor can be formed via adsorbing the precursors onto a carbon or organic matrix (col. 4, lines 40-41 of Helble et al.); the mixture is introduced into a high temperature environment (e.g., a furnace), which should be sufficiently high to cause the organic carrier to ignite and react exothermically (i.e., combust). A preferred temperature range is from about 1200 K to 1500K (926.85°C to 1226.85°C). See col. 4, lines 50-64 of Helble et al., which also discloses that the temperature environment also comprises an atmosphere of at least 20% by volume oxygen (col. 4, lines 59-61) (considered to read upon **claims 3 and 6**).

The process disclosed in Helble et al. "has successfully produced nanophase (20 nm) magnesium oxide and (15 to 30 nm) zirconium oxide", as well as powders of  $\text{TiO}_2$ ,  $\text{Fe}_3\text{O}_4$ ,  $\text{Fe}_2\text{O}_3$ ,  $\text{Al}_2\text{O}_3\text{-ZrO}_2$ ,  $\text{BaTiO}_3$ , PZT, and mullite. See col. 6, lines 14-30 of Helble et al. (considered to read upon **claim 9**).

In view of these teachings, Helble et al. anticipate claims 1-10, 13, and 17.

***Allowable Subject Matter***

5. Claims 14 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art does not teach or suggest Applicants' claim limitations regarding the particles having sizes less than 5 nm (claim 14) or less than 2nm (claim 16).

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

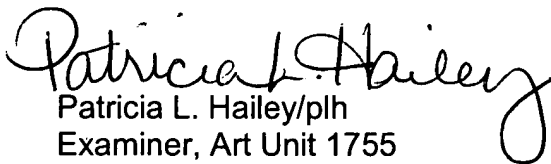
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patricia L. Hailey whose telephone number is (571) 272-1369. The examiner can normally be reached on Mondays-Fridays, from 7:00 a.m. to 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo, can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group 1700 Receptionist, whose telephone number is (571) 272-1700.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
Patricia L. Hailey/plh  
Examiner, Art Unit 1755  
January 31, 2007

  
J. A. LORENGO  
SUPERVISORY PATENT EXAMINER